DOCUMENT RESUME

ED 227 960 PS 013 447

AUTHOR Harvey, Philip D.; And Others
TITLE Relating Speech and Cognitive Deficits in Children Vulnerable to Psychopathology.
SPONS AGENCY National Inst. of Mental Health (DHHS), Rockville, Md.
PUB DATE [81]
GRANT NIMH-MH-21145
NOTE 21p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Children; Comparative Analysis; *Depression (Psychology); *High Risk Persons; *Parent Influence; Performance Factors; *Research Methodology; Research Problems; *Schizophrenia
IDENTIFIERS Assessment; *Referential Communication

ABSTRACT

To determine whether or not both speech and laboratory assessments of referential communication ability measure a single area of competence, three groups of children were formed on the basis of their parents' diagnostic status: schizophrenic, unipolar depressive, or bipolar disordered. The breakdown of subject groups was as follows: 23 children of schizophrenics; 43 children of unipolar depressives; 38 children of bipolar disordered; and 53 children of normal parents, who served as controls. Speech samples describing five Thematic Apperception Test (TAT) cards were collected. A cognitive task was then administered; the two conditions of this task included "Type 1" items, which were solvable solely on the basis of associative strength, and "Type 2" items, which were constructed so that the incorrect alternative response was a higher associate of the referent than the correct alternative. Two-way ANOVA's with Age and Parental Diagnosis were computed for each dependent variable. Newman-Keuls tests indicated that children of schizophrenics produced more unclear and ambiguous references than children of unipolar depressives and bipolar disordered parents. In turn, children in the last two groups produced more unclear and ambiguous references than children of normal parents. Children of schizophrenics also produced fewer explicit verbal references than all other children. Results are perceived as being important in terms of the need to actually assess speech performance before making statements about communication competence from cognitive task performance. (RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent offical NIE position or policy.

ED227960

Relating Speech and Cognitive Deficits in Children Vulnerable to Psychopathology

Philip D. Harvey

State University of New York at Binghamton

Sheldon Weintraub and John M. Neale

State University of New YOrk at Stony Brook

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Philip D. Harvey
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS013447

Abstract

Children of schizophrenics (n = 23), unipolars (n = 43), bipolars (n = 38), and a normal contrast group (n = 53) were compared on speech and laboratory measures of referent communication ability. Children of schizophrenics were most deviant on both measures, with children of affectively disordered parents more deviant than children of normals only on speech measured referent communication. Task and speech measured referent communication abilities only correlated within children of normals, indicating that researchers cannot reliably infer that task measures of cognitive abilities are related to speech performance in high-risk children. These results are discussed in terms of the need to actually assess speech performance before making statements about communication competence from cognitive task performance.

Many different methodologies have been employed in the assessment of referential communication deficits in psychotics, including free response "password" tasks (e.g., Cohen & Cahmi, 1967), forced-choice, two alternative, "password" tasks, (e.g, Smith, 1970), free speech discrimination of two similar stimuli (e.g., Cohen, Nachmani, & Rosenberg, 1973), and the use of speech to adequately refer to previously presented information (e.g., Rochester & Martin, 1979). While it is fairly clear that schizophrenics are relatively less competent than normals at referential communication (e.g., Cohen & Cahmi, 1967; Cohen, Nachmani, & Rosenberg, 1973; Rochester, Martin, & Thurston, 1977), it is less clear if these deficits are specific to schizophrenia (e.g., Kagan & Oltmanns, 1981; Durbin & Marshall, 1977). When contrast groups have been included (e.g., Kagan & Oltmanns, 1981), affectively ill patients do not differ from schizophrenics, suggesting that these deficits are not specific to schizophrenia. Furthermore, none of these reports have used both laboratory tasks and linguistic methods. It remains to be seen, therefore, if these different methods of assessing referential communication are measuring a unitary competence area.

Other problems in the literature exist as well. Laboratory measures of referential communication have not been correlated with clinical ratings of thought disorder, making inferences about their relationship tenuous. Also, investigators reporting on laboratory measures of referent communication which involve different conditions (e.g., Smith, 1970) have often not matched their different conditions for the ability to discriminate groups. If two groups of differing ability are assessed with two tasks of unequal discriminating power,

a group by task interaction can be artifactually induced (Chapman & Chapman, 1973).

Finally, while some (e.g., Kagan & Oltmanns, 1981; Harvey, Weintraub, & Neale, in press) have suggested that referent communication difficulty may be a marker of vulnerability to schizophrenia, problems of third variables and causal direction exist when patients are already psychotic at the time of the research.

In order to avoid some of these problems, the longitudinal assessment of children at high-risk for psychosis was developed (Mednick & McNeil, 1968). This method allows for the assessment of the etiological role of psychological deficits and behavioral signs in the development of schizophrenia and schizophrenic symptoms. In addition, some of the third variable problems (e.g., medication, clinical state) can be avoided by studying individuals who have never been psychotic. High-risk investigations of cognitive and speech variables have indicated that children at risk for psychosis have deficits in attention (e.g., Harvey, Winters, Weintraub, & Neale, 1981), conceptual ability (e.g., Oltmanns, Weintraub, Stone, & Neale, 1978) speech measured referential communication (e.g., Harvey, Weintraub, & Neale, in press), and task measured referential communication using an open-ended task (e.g., Winters, Weintraub, Stone, & Neale, 1981). It remains to be seen, however, if speech measured and task measured referential communication abilities are related within children at risk for psychosis.

The present report is an attempt to relate these two research methods. The Kagan and Oltmanns (1981) two alternative forced choice referential communication

task was used to assess referential communication abilities in children vulnerable to psychopathology. This task has two conditions, matched for discriminating power (Chapman & Chapman, 1973). In one condition (Type 1 items), the correct alternative is a high associate of the referent, allowing the trials to be solved solely by associative responses. The other condition (Type 11), is constructed such that the incorrect alternative response is a higher associate of the referent than the correct alternative. Kagan and Oltmanns were able to discriminate schizophrenics and affectively ill patients from normals by patients' relatively higher number of Type II errors, with no differences between groups on Type 1 errors. In this paper we report on the relationship between Kagan and Oltmanns' task and speech measures from a previous report by Harvey, Weintraub, and Neale (in press). The number of unclear and ambiguous references to previously presented verbal material and explicit verbal reference, a competent reference strategy, were correlated with performance on the laboratory task. It is expected that if the two methods of assessment are measuring a single area of competence, there will be significant relationships between the methods. Additionally, if task measured referent communication deficits are a specific marker of vulnerability to schizophrenia, it is expected that children of schizophrenics will be more deviant than all other children on that risk.

Methods

Subjects. Groups of children were formed on the basis of their parents' diagnostic status. All patients who were newly admitted to one of four local

psychiatric hospitals were considered for admission. Patients with a primary diagnosis of organicity of substance abuse were not considered. Patients were assessed with the Current and Past Psychopathology Scales (CAPPS, Spitzer & Endicott, 1968), a short form of the MMPI (Kincannon's [1968] Mini-Mult), hospital case record summary, and the spouse's report of the events leading up to the hospitalization. The diagnostic information on each case was independently rated by two of three trained diagnosticians who had to assign a diagnosis of either schizophrenia, unipolar depression, bipolar disorder, or other. The Research Diagnostic Criteria (RDC, Spitzer, Endicott, & Robins, 1978) was used for the affective groups and the schizophrenia diagnosis was a narrow European-style group, quite similar to the current DSM-III (American Psychiatric Association, 1980) criteria. A confidence rating of 4 on a six-point scale was required for inclusion. The interrater agreement (Cohen's [1960] Kappa) was high, ranging from .84 to .92.

Children of normal parents were selected from the classrooms of the target sample. Parents were then contacted and asked to participate in a study of family relations. The parental assessment battery was completed on all of the parents of children in the normal sample; in the two cases where significant psychopathology was found, the family was excluded. The data presented in this paper were collected at the third laboratory visit for the children, approximately five years after their entry into the study. The first visit had taken place within a short time after entry, with the next two visits at roughly two and one-half year intervals. One hundred and fifty seven children, ranging in age from 7 to 18, were tested. The breakdown of subject groups is as follows:

children of schizophrenics (23), children of unipolars (43), children of bipolars (38), normal contrast group (53). Table 1 includes demographic information for families, including evaluations of parental psychopathology.

Insert Table 1 about here

Tasks. The speech sample for referential communication analysis was collected from children in response to instructions to describe 5 TAT cards. Children were asked to "Tell me a story about the card." The experimenter gave prompts as necessary ("Um-hm," "OK," "Any more?"), while the child spoke. After each child finished his or her initial story, they were asked "What happened before?" and "What happened after?" When children asked questions about the cards, they were told "You have to tell me." The order of card presentation was randomized across subjects and the speech sample was tape-recorded. The experimenter transcribed the sample immediately afterwards. In all, approximately five minutes of speech were recorded for each child.

The cognitive task used to measure referential communication was Kagan and Oltmanns' (1981) refinement of the Smith (1970) task. It is a single word referential communication task, with two conditions matched for discriminating power. The two conditions, Type 1 and Type 11, were randomly intermixed and presented in constant order to the subjects. For each of the 12 trials in each condition, the subject was presented with a pair of words, with one word underlined. Directly underneath the word pair were two numbered words. The children were instructed to pretend that they were playing a password game with a partner who was unaware of the identity of the referent. They were asked to choose the better of the two numbered alternatives to allow the imagined listener to discriminate the referent. Two practice trials were presented to the

subjects before the task proper was begun. In the first, the subject was shown the proper choice and in the second, the subject was allowed to choose for him/herself. The task was not begun until the child was able to fully understand the rationale of the task and was able to explain the reason for their choice on the second practice item. Type I items were solvable solely on the basis of associative strength, as the referent and correct clue (of the two presented) were more highly related than the referent and the incorrect solution. The correct alternative was unrelated to the nonreferent. In Type II items, the referent and incorrect alternative were most highly related, with the incorrect alternative also associated with the nonreferent. The correct alternative was less highly associated with the referent than the incorrect alternative, but was unrelated to the nonreferent.[1] Examples of Type I and Type II are presented in Table 2.

Insert Table 2 about here

Scoring the speech sample. The speech sample was scored according to the procedure developed by Rochester and Martin (1979) from the Halliday and Hasan (1976) model of cohesion in English. The full array of verbal productivity, cohesion, and reference patterns scored on the children was presented in Harvey, Weintraub and Neale (in press) and will not be fully repeated here. The two measures of speech competence to be presented here, the number of unclear and ambiguous references and the number of explicit verbal references, were selected because they should be most highly related to the referent communication task. Two trained undergraduate raters scored each child's transcript for all of the verbal productivity, cohesion, and reference variables. The average interrater

reliability (Kappa) of the speech measures was .83.

Reference processes are those whereby noun phrases are related to each other. There are several locations for information which is later referred to, including the explicit verbal context, the nonverbal situation, or implicit location in the verbal context. Explicit verbal reference is the process of providing the information necessary for other verbally presented information to be comprehensible. In the Harvey et al. report, it was found that explicit verbal reference was a prime discriminator of children of schizophrenics and all other children. Unclear and ambiguous references are references where the referent is not immediately determinable. Unclear and ambiguous references discriminated children of psychotics from children of normals, with children of schizophrenics the most deviant on both measures. Because of the relatively low frequency of each individual measure, in this report the number of unclear and ambiguous references were combined to form a single dependent measure.

Procedure. The children were tested as a part of a full day's visit to the laboratory, which included several tasks and game-like activities. Testers and coders were blind to parental diagnoses and all hypotheses.

Results

Speech Measures. Means and standard deviations for the combined total of unclear and ambiguous references and total number of explicit verbal references are presented in Table 3. Pearson Product moment correlations between estimated verbal IQ (sum of WISC subscales Information and Comprehension) and the two dependent variables were computed; both were nonsignificant.

Insert Table 3 about here

Two-way ANOVAs with Age (7-14, 15-18) and Parental Diagnosis (schizophrenic, unipolar, bipolar, normal) were computed for each dependent variable. No effects of Age or Age by Parental Diagnosis interactions were found. Significant Parental Diagnosis effects were found for both the combined total unclear and ambiguous references, F (3,153) = 18.79, $p < .001$, and total number of explicit verbal references, F (3,153) = 6.38, $p < .005$. Newman-Keuls tests indicated that children of schizophrenics produced more unclear and ambiguous references than children of unipolars and bipolars ($p < .05$), who in turn produced more unclear and ambiguous references than children of normals ($p < .05$). Children of schizophrenics also produced fewer explicit verbal references than all other children ($p < .05$).

Task measured referential communication. The dependent variables were the total number of errors in identifying the proper clue for Type 1 and Type 11 items. Means and standard deviations are contained in Table 3. Pearson Product moment correlations were computed between both dependent measures and estimated verbal IQ; both correlations were nonsignificant.

A two-way repeated measures ANOVA with factors of Parental Diagnosis (Schizophrenic, Unipolar, Bipolar, Normal) and Item (Type 1, Type 11), with the final factor repeated, was computed on the error scores. A significant Parental Diagnosis by Item interaction was found, F (3,153) = 3.60, $p < .05$. The significant interaction was analyzed by creation of an index of the difference of Type 11 and Type 1 errors, as suggested by Kagan and Oltmanns (1981).

A one-way ANOVA, with a factor of Parental Diagnosis, was performed on that difference score. The main effect of Parental Diagnosis was significant, F (3,153) = 6.30, $p < .01$. Newman-Keuls tests indicated that children of schizophrenics had a significantly higher number of Type 11 errors than Type 1 errors, relative to all other children ($p < .05$).

Correlational Analyses. Pearson Product moment correlations were computed between the difference of Type 11 and Type 1 errors and scores on the two speech variables. The correlations for each diagnostic group are presented in Table 4.

Insert Table 4 about here

The word communication task error score did not predict the number of explicit verbal references or the number of unclear and ambiguous references for any of the psychiatric patient-parent offspring groups. The difference of Type 1 and Type 11 errors did predict the number of explicit verbal references for the normal contrast group, however, with a lower score predicting a higher number of explicit verbal references, $r = -.34$, $p < .05$.

Discussion

The results of this investigation suggest that task and speech measured referent communication performance are unrelated in the children of schizophrenics. Therefore, it can be reasonably concluded that both of these measures cannot be assessing a single marker of vulnerability.

At the same time, both these measures seem to identify some deficits which are fairly specific to vulnerability to schizophrenia. Having a

schizophrenic parent reliably predicts performance on both indices of referential communication deficits. It is only in children of normals, however, that the two are interrelated. If this was a standard examination of cognitive deficits in vulnerable children, without using speech performance as a reference point for cognitive abilities, we might possibly have made inferences about the relationship of these task measured referential communication abilities and the previously reported Harvey et al. (in press) speech data. The actual relationship which we found between speech and task measured deficits highlights a major methodological problem, present in both high-risk and adult psychological deficit literatures (see Harvey & Neale, in press, for a further discussion of this problem). It is now clear that researchers studying vulnerable children cannot infer that cognitive deficits reliably predict speech or communication dysfunction.

References

American Psychiatric Association, Diagnostic and statistical manual of mental disorders, Washington, D.C.: APA, 1980.

Chapman, L. J. & Chapman, J. M. Disordered thought in schizophrenia, New York: Appleton, Century, Crofts, 1973.

Cohen, B. D. & Cahmi, J. Schizophrenic performance in a word-communication task. Journal of Abnormal Psychology, 1967, 72, 240-246.

Cohen, B. D., Nachmani, G., & Rosenberg, S. Referent communication disturbances in acute schizophrenia. Journal of Abnormal Psychology, 1974, 83, 1-13.

Cohen, J. A. A coefficient of agreement for nominal scales. Educational and Psychological Measurement, 1960, 20, 37-46.

Durbin, M. & Marshall, R. L. Speech in mania: Syntactic aspects. Brain and Language, 1977, 4, 208-218.

Halliday, M. A. K. & Hasan, R. Cohesion in English, London: Longman, 1976.

Harvey, P. D. & Neale, J. M. The specificity of thought disorder to schizophrenia: Research methods in their historical perspective. Progress in Experimental Personality Research, in press.

Harvey, P. D., Weintraub, S., & Neale, J. M. Speech competence of children vulnerable to psychopathology. Journal of Abnormal Child Psychology, in press.

Harvey, P. D., Winters, K. C., Weintraub, S., & Neale, J. M. Distractibility in children vulnerable to psychopathology. Journal of Abnormal Psychology, 1981, 90, 298-304.

Kagan, D. L., & Oltmanns, T. F. Matched tasks for measuring single-word referent communication: The performance of patients with schizophrenic and affective disorders. Journal of Abnormal Psychology, 1981, 90, 204-212.

Kincannon, J. C. Prediction of the standard MMPI scale scores from 71 items: The Mini-Mult. Journal of Consulting and Clinical Psychology, 1969, 32, 319-325.

Mednick, S. A., & McNeil, T. F. Current methodology in research on the etiology of schizophrenia: Serious difficulties which suggest the use of the high-risk group method. Psychological Bulletin, 1968, 70, 681-693.

Meehl, P. E. Schizotaxia, schizotypy, schizophrenia. American Psychologist, 1962, 17, 827-837.

Neale, J. M., & Weintraub, S. The Stony Brook high-risk project. Journal of Abnormal Child Psychology, 1975, 3, 95-113.

Oltmanns, T. F., Weintraub, S., Stone, A. A., & Neale, J. M. Cognitive slippage in children vulnerable to schizophrenia. Journal of Abnormal Child Psychology, 1978, 6, 237-245.

Rochester, S. R., & Martin, J. R. Crazy talk: A study of the discourse of schizophrenic speakers. New York: Plenum, 1979.

Rochester, S. R., Martin, J. R., & Thurston, S. Thought process disorder in schizophrenia: The listener's task. Brain and Language, 1977, 4, 95-114.

Smith, E. E. Associative and editing processes in schizophrenic communication. Journal of Abnormal Psychology, 1970, 75, 182-186.

Spitzer, R. L., & Endicott, J. Current and past psychopathology scales, (CAPPS). New York: Biometrics Research, 1968.

Spitzer, R. L., Endicott, J., & Robins, L. The schedule for affective disorders and schizophrenia, (SADS). New York: Biometrics Research, 1978.

Winters, K. C., Stone, A. A., Weintraub, S., & Neale, J. M. Cognitive and attentional deficits in children vulnerable to psychopathology. Journal of Abnormal Child Psychology, 1981, 9, 435-453.

Footnotes

This research was supported in part by grant number MH21145 from the National Institute of Mental Health. Address all correspondence to: Philip D. Harvey, Department of Psychology, State University of New York at Binghamton, Binghamton, New York 13901.

[1]These two conditions were matched for discriminating power by equating difficulty level and coefficient alpha in a wide ranging normal population. Details of this matching process and of the associative strengths of the items are available in Kagan and Oltmann (1981).

Table 1

Demographic Information on Offspring and Patient/Parents.
Standard deviations are in parentheses.

Offspring	Diagnostic Groups			
	Schizophrenics	Unipolars	Bipolars	Controls
N	23	43	38	53
Mean Age	13.3 (3.0)	13.3 (3.1)	14.2 (2.7)	14.2 (2.5)
% Female	48	49	53	53
N Families	16	30	27	42
Patient/Parents				
Global Rating Scale for Psychopathology[a]	24.7 (5.5)	33.2 (5.9)	24.8 (6.2)	--
Number of Prior Hospitalizations	2.3 (1.9)	1.7 (1.8)	2.3 (2.0)	--
Total Days Previously Hospitalized	137 (130.8)	82.4 (88.0)	113.2 (98.0)	--
Occupation Rating[b]	3.8 (1.0)	3.7 (1.1)	3.4 (1.6)	3.8 (1.2)
Education[c]	3.9 (1.3)	3.8 (1.4)	3.4 (1.5)	3.7 (1.8)

---

a Based on the Global Assessment Scale (Spitzer and Endicott, 1978); Lower scores indicate more severe psychopathology.

b Based on the data from the CAPPS; 1 = High Executive, major professional, 7 = Unskilled employee.

c Based on the data from the CAPPS; 1 = Professional Degree, 7 = Under 7 years of school.

Table 2

Examples of Type 1 and Type 2 Items

Type 1		Type 2	
Drill[a]	March	Painter[a]	Artist
1. Dentist[b,c]		1. Ladder[b]	
2. Parade		2. Picture[c]	

---

[a] Referent

[b] Best response: Stronger associate of the referent than nonreferent

[c] Association of this clue and the referent is stronger than association of other clue and referent

Table 3

Scores on Speech and Cognitive Variables

Speech Variables	Group (children of)							
	Schizophrenic		Unipolar		Bipolar		Normal	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Explicit verbal[a] references	7.0	(2.6)	10.6	(3.8)	10.6	(3.4)	11.0	(3.6)
Unclear and ambiguous[b] references	2.9	(2.7)	2.1	(2.1)	2.4	(2.5)	0.4	(0.7)
Cognitive Variables								
Type I Errors	2.55	(3.04)	3.10	(3.44)	1.73	(2.91)	2.12	(3.44)
Type II Errors	3.86	(4.40)	3.25	(4.09)	1.83	(3.41)	2.32	(3.82)
Difference of Type I[c] and Type II Errors	1.31	(2.75)	0.15	(2.44)	0.09	(1.28)	0.20	(1.35)

[a] $p < .01$

[b] $p < .001$

[c] $p < .05$

Table 4

Correlations of Speech and Cognitive Variables by Parental Diagnosis

	Children of Schizophrenics (n = 23)		
	1	2	3
1 Unclear and ambiguous references	1.00	.09	.15
2 Verbal references		1.00	-.11
3 Type II-Type I Errors			1.00

	Children of Unipolars (n = 43)		
	1	2	3
1 Unclear and ambiguous references	1.00	-.16	.15
2 Verbal references		1.00	-.13
3 Type II-Type I Errors			1.00

	Children of Bipolars (n = 43)		
	1	2	3
1 Unclear and ambiguous references	1.00	.50[a]	.15
2 Verbal references		1.00	.01
3 Type II-Type I Errors			1.00

	Children of Normals (n = 53)		
	1	2	3
1 Unclear and ambiguous references	1.00	.01	-.03
2 Verbal references		1.00	-.34[a]
3 Type II-Type I Errors			1.00

[a] $p < .05$